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(54) METHOD AND DEVICE FOR THE TESTING AND VISIBLE
 REPRESENTATION OF THICKNESS DIFFERENCES
 IN PAPER

(71) We G. A. O. GESELLSCHAFT FÜR AUTOMATION UND ORGANISATION mbH., München, Euckenstr. 12, Germany, a German Body Corporate, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The present invention relates to a method and a device for the testing and visible representation of thickness differences in paper caused by inserts or embedments. Such differences in thickness result e.g. 15 from water marks and security threads in paper money or banknotes and similar securities. The invention, therefore, is in particular concerned with testing and proving the existence of water marks and security threads in securities, in order thus 20 to be able to examine the authenticity of the securities by means of this test.

Quite a number of authenticity testing methods are already known or have been 25 proposed, all of which are based either on thickness measurements or on fluoroscopic or transmitted-light processes.

The apparatus for carrying out the known methods involve a considerable expenditure 30 so that they are only used at central points or stations. It is frequently desirable, however, to be able to carry out an authenticity test at a bank counter, so that a simple device is required for carrying out 35 the authenticity test.

The present invention provides a device that produces a visual image of inserts embedded in securities in such a way that the existence of the inserts as well as their positions becomes visually recognizable and, 40 consequently, capable of being checked, in order thus to perform an authenticity test.

One embodiment of the invention makes use of the known so-called permanent writing 45 pad principle. With the aid of such a

permanent writing pad it is possible to write or draw by applying pressure to the pad using a pointed article. The writing or drawing can be erased thereafter. This is made possible in one arrangement by providing 50 over a solid base a paraffin-waxed paper over which, in turn, there is arranged a sheet of tissue paper protected by a transparent plastics foil. When writing or drawing 55 thereon by means of a pointed article, the tissue paper is caused to stick to the paraffin-waxed paper at points where pressure is applied, these points appearing more dark than the surrounding area and, consequently, providing a legible or recognizable 60 image. By mechanically separating the points which have thus been caused to stick together, the image can be cancelled or erased, thus restoring the permanent writing 65 pad to its original state.

In the preferred embodiment for carrying-out the present invention, there is used a testing device including a form of permanent writing pad, whereby the representation and consequently also the recognition 70 of an insert which is embedded in a test object and which is the cause of differences in thickness, may result from the application of pressure to an object to be tested, in some way or other. 75

With the aid of a simple device it is possible by means of the present invention to carry out a test on any size or format of paper, in the course of which any and all areal-line- and spot-shaped differences 80 in thickness existing in the paper to be tested, will appear as a dark image. In a preferred embodiment genuine differences only in thickness of the paper are represented, because any other apparent thickness differences which are mechanically introduced 85 into the paper, for example by fold and creases, will subject a part of the device to an elastic deformation owing to the way in which the device is designed, 90

and will thus not be represented or imaged by the device. In one embodiment the test device includes a convex imaging or operating surface that can be rolled over or applied to the paper to be tested like an ink-blotter. The differences in thickness, i.e. the watermarks and security threads in the case of banknotes or paper money, will then be represented or imaged in a well visible fashion. It is alternatively possible, however, to fasten the paper to be tested firmly on, for example, a roller by means of a clamping device, which ensures that it is stretched tight, and to roll this over a plane imaging surface of a testing device. Finally, it is possible to arrange the paper to be tested parallel to a plane imaging surface of a testing device and to press the paper arranged parallel thereto on to the plane surface in order to provide a visible image or representation.

The principle of the invention can be applied to the testing and visible representation of differences in thickness arising from various sources such as surface finish, surface roughness or unevenness.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 is a diagrammatic side view of a testing device with a convex imaging surface in its normal condition,

Fig. 2 is a diagrammatic side view of the testing device during the erase procedure,

Fig. 3 is a section taken along the line A-A of Fig. 2, and

Fig. 4 is a diagrammatic side view of the testing device during the imaging procedure.

The testing device employing a convex imaging surface shown in the drawings has a base part 2 over the convex bottom surface of which there is clamped or tightly fastened a frame 3 made from spring steel or any other suitable resilient material. One side of the frame 3 is attached flexibly with the aid of a strap 1 to the base part 2 while the other side of the frame is attached by means of a flexible fastening to a handle portion 4.

The details of the test device can best be seen in Fig. 3 of the drawings. Over the convex bottom surface of the base part 2 there is stretched a sheet of paraffin-waxed paper 5, which is firmly attached, by means not shown, to the aforesaid base part 2. A transparent and self-adhesive foil 7, of, e.g., a transparent plastics material, serves to fix a sheet of tissue paper 6 to the frame 3, and to protect the tissue paper from being damaged.

Fig. 4 of the drawings shows the test

device in its operative position, i.e. during the imaging procedure. An object to be tested, for example, a banknote 8 is placed on a plane solid surface, e.g. a glass plate 9. The test device is rolled over the banknote 8 in the direction indicated by the arrow 10. Any watermarks, security threads, or other inserts embedded in the test object will then be represented and become clearly visible on the bottom of the test device due to the well known effect of pressure on an assembly comprising a sheet of paraffin-waxed paper and a sheet of tissue paper.

Fig. 2 of the drawings shows the cancellation or erase procedure following the imaging process. When a pressure is exerted upon the frame 3 in the direction as indicated by the arrow 11, the frame 3 is caused to arch off the bottom surface of the base body 2, due partly to the flexibility of the strap 1. Owing to this action, the parts of the tissue paper 6 sticking or adhering to the paraffin-waxed paper 5, are separated therefrom and the image is thus erased.

On account of the resilient or elastic properties of the frame 3, the test device will immediately resume its original condition when the pressure exerted upon the frame 3 is relieved. The test device is thus immediately ready for being used again for the next object to be tested.

The test device as described hereinbefore may also be constructed in such a way that various other test procedures may be combined with the one described herein. When constructing a device with a plane imaging surface, instead of a convex surface, it is possible to detect simultaneously any chemical or fluorescent substances which are embedded in the paper, e.g. by means of a detector embodied in the body 2. Moreover, it may prove to be appropriate to mark the paper to be tested e.g. by way of stamping, perforating or printing. This would also provide a possibility for the authenticity of the paper, e.g. a voucher to be checked without arousing suspicion, by pretending that it has to be defaced, cancelled, designated, recorded or registered.

Although the invention has been described, by way of example with reference to a particular embodiment, it will be appreciated that variations and modifications can be made within the scope of the appended claims. For example the means for producing an image need not be incorporated in the device in such a way that the image can easily be erased. It can be a pressure sensitive assembly which produces a permanent image, although such an arrangement would require the assembly to be replaced for each paper tested.

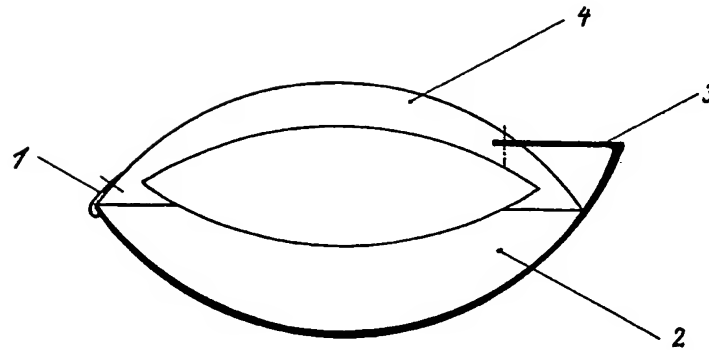


Fig. 1

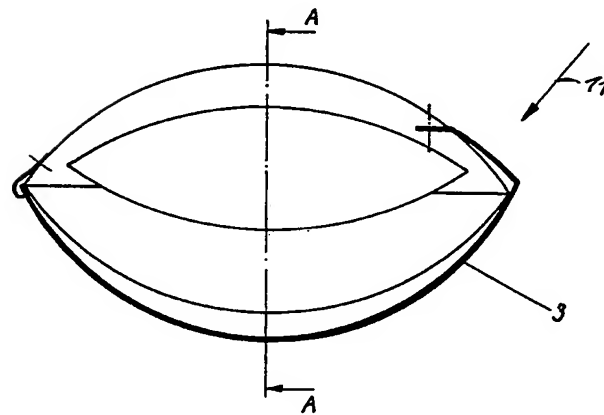
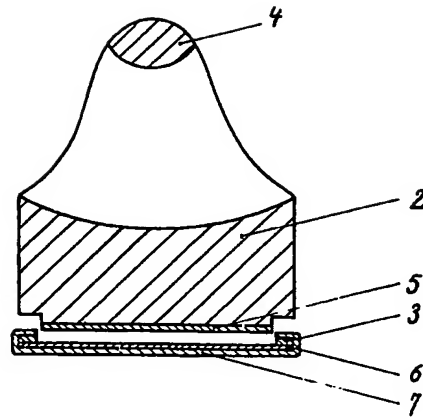
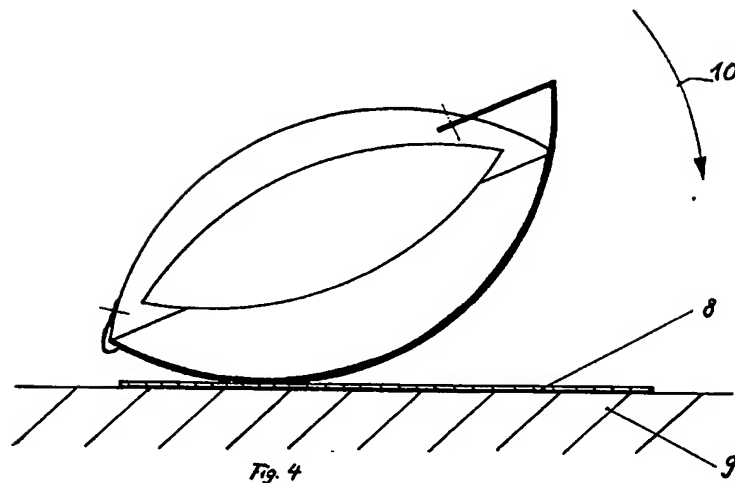


Fig. 2

*Fig. 3**Fig. 4*